## Strait of Juan de Fuca Action Area

Ecosystem benefits provided by action area	Local threats to ecosystem benefits	Priority action area strategies
<ul> <li>animals</li> <li>Summer chum salmon spawn only in eastern Strait of Juan de Fuca and Hood Canal tributaries</li> <li>Unique habitat type and ecosystem processes</li> <li>Marine/estuary: Exchange of fresh and marine waters helps keep Puget Sound from becoming stagnant</li> <li>Marine/estuary: Migration corridor for fish, bird and marine mammal species</li> <li>Marine/estuary: Protection Island is marine mammal haul-out area and Puget Sound's major marine bird rookery</li> <li>Upland: Intact forests in and around Olympic National Park, Forest, and Wilderness Areas</li> <li>Food and timber (harvest)</li> <li>Timber and pulp production</li> <li>Non-timber products (cultural and commercial materials for basketry, carving, and floral arrangements)</li> <li>Agricultural production with an extended growing season because of low precipitation conditions</li> <li>Shellfish production</li> <li>Commercial, recreational, and tribal fishing</li> <li>Hatcheries provide harvest opportunities and population stability while wild salmon stocks rebuild: Elwha spring Chinook, Dungeness pink salmon</li> <li>Recreation and tourism</li> <li>Olympic National Park and Forest, Dungeness National Wildlife Refuge, Olympic Discovery Trail, Highway 112 Scenic Byway</li> <li>Community and economy</li> <li>Rural communities</li> <li>Favorable climate conditions draws retirees to reside in area</li> <li>Marine vessel passage, shipping and marine trades</li> <li>Jamestown S'Klallam Tribe</li> <li>Lower Elwha Klallam Tribe</li> <li>Makah Tribe</li> <li>Otter</li> <li>Otter</li> </ul>	rine/estuary: Loss of estuary habitat and pocket estuaries; derelict fishing gear rine nearshore: 14% of shoreline modified stretching from Point Wilson to Elwha; 1439 overwater structures; miles of railroad along marine shoreline shwater: Blocked habitat in over 70 miles of river mainstem and tributaries; 95% of historic Chinook habitat cked by Elwha Dam system; disruption of river processes through dikes, loss of large woody debris and wrining gravels, riparian development, vegetation removal, and some forest practices land: Loss of working farms and forests through conversion  dics: Port Angeles Harbor contamination, including Rayonier Mill site contamination; contamination from remhouse Beach Open Dump site threatens human health, water quality, and shellfish areas; threats from oil is and other contaminants due to high marine transportation rates cterial pollution: High levels of pathogen contamination in lower Dungeness River (including independent teams) and Dungeness and Discovery bays resulting in shellfish bed closures face water runoff impacts: Combined Sewer Overflow events (69 in 2007); point and non-point sources of utants  er resources  iited water availability for people, farms, and fish: Low summer (and some year round) flows in WRIA 17, 18, extreme high flows in WRIA 18 & 19; critical freshwater shortages in Neah Bay; many instream flow rules not ablished eration of surface hydrology: Major alteration of flows in Elwha and Dungeness Rivers	A: Protect intact ecosystem processes, structures, and functions Protect high value habitat: Acquire priority habitats identified in the Salmon Recovery Plan Update and implement regulatory programs: Critical Area Ordinance (Sequim); Shoreline Master Programs (Clallam County, Port Angeles, Sequim, Jefferson County) Protect and conserve water flows: Establish and enforce instream flow rules for WRIA 17, 18, 19; complete and/or implement 2514 plans; improve aquifer resources in the Dungeness and other flow limited basins Protect and support long-term stewardship of working farms, forests and shellfish farms  B: Restore ecosystem processes, structures, and functions Implement priority ecosystem restoration projects: Complete Elwha River Ecosystem Recovery efforts and associated projects Implement Salmon Recovery Plans and multi-species strategies through the three-year work plans, including: Puget Sound Chinook, Eastern Strait of Juan de Fuca/Hood Canal Summer Chum, bull frout Implement Everse Practices Habitat Conservation Plans Implement Forest Practices Habitat Conservation Plans Implement Road Maintenance and Abandonment Plans on private and public lands Implement Conservation District Work Plans Implement Dungeness River management plans Clean up and restore the Port Angeles Harbor and waterfront; update and implement the Harbor Resource Management Plan for ecosystem restoration, development and redevelopment; identify local lead  C: Reduce the sources of water pollution Prevent pollution: Implement Sequim-Dungeness and East Jefferson Clean Water District Strategies to address TMDLs and shellfish downgrades; enhance capacity to address and mitigate threats and impacts from marine vessel traffic including a permanent tug at Neah Bay and oil spill response capacity for the Makah tribe  Manage stormwater runoff: Implement NPDES permits; update and implement Stormwater Management Plans and Codes (Callam County, Sequim); reduce CSO events (Port Angeles) Upgrade and manage wastewater treatment plants: Implement Car

#### **Hood Canal Action Area**

	Local threats to ecosystem benefits	Priority action area strategies
<ul> <li>Unique summer chum salmon stock spawns only in Hood Canal and eastern Strait of Juan de Fuca</li> <li>Unique habitat type and ecosystem processes</li> <li>Skokomish River is largest salmon producing river in West Sound</li> <li>Marine/estuary: Migration corridor for fish, bird and marine mammal species along nearshore</li> <li>Marine/estuary: Exchange and mixing of fresh and marine waters, including Admiralty Inlet</li> <li>Upland: Intact forests in and around Olympic National Park, Forest, and Wilderness Areas</li> <li>Freshwater resources</li> <li>Water and/or hydropower supply for city of Bremerton, city of Port Townsend, city of Tacoma, eastern communities of Kitsap County</li> <li>Groundwater wells for upland communities</li> <li>Food and timber (harvest)</li> <li>Timber, pulp and secondary forest product production Internationally renowned oysters</li> <li>Agricultural production with an extended growing season, specialty farming</li> <li>Commercial, recreational and tribal fishing and shellfishing including salmon and trout, geoduck, oysters, clams, Dungeness crab and Spot Prawn</li> <li>Hatcheries provide harvest opportunities and population stability while wild salmon stocks rebuild (Summer chum salmon; reintroduction of spring Chinook and other species to North Fork Skokomish)</li> <li>Recreation and tourism</li> <li>Boating, sailing, water skiing, diving, hunting, birding, kayaking, sportfishing, Olympic National Park, state and local parks</li> <li>Seasonal residences</li> <li>Community and economy</li> <li>Hood Canal Bridge provides transportation linkage between Kitsap and Olympic peninsulas</li> <li>Rural communities</li> <li>Marine trades and marine vessel passage</li> <li>Homeland security: U.S. Navy Submarine Base at Bangor and Naval Munitions Center at Indian Island</li> </ul>	Habitat alteration  Marine/estuary: Loss of estuary habitat and pocket estuaries; loss of recreational, tribal, and commercial shellfish beds through habitat modifications; derelict fish gear in some locations  Marine nearshore: Disruption of marine shoreline processes from roads, homes, and shoreline armoring that have altered sediment supply, vegetation, water quality and freshwater inputs  Freshwater: Blocked habitat including North Fork of Skokomish blocked by Cushman dam, South Fork seasonally blocked by habitat degradation and multiple culverts; loss of floodplain processes and functions due to decreased flood storage capacity, sediment aggradation; loss of wetlands, altered floodplain connectivity, hydrology, channel network, and riparian area, loss of channel function by simplification and wood removal; increased sedimentation and altered hydrology from poorly maintained or abandoned logging roads  Upland: Loss of working farms and forests through conversion  Pollution  Toxics: Industrial pollution from mill site in Port Gamble Bay  Bacterial pollution and pathogens: loadings from human and animal waste lead to shellfish and recreational swimming beach closures.  Nutrient loading: significant low dissolved oxygen conditions  Surface water runoff impacts: Impervious surfaces and pollutants from stormwater and some agricultural and foresty practices  Freshwater resources  Major alterations in flows: Union, Skokomish, Big and Little Quilcene rivers  Limited water availability for people, farms and fish: year round low flows, seasonal low flows, and extreme high flows in all Hood Canal WRIAs; many instream flows not established  Invasive species  Negative ecological impacts on native populations, marine and riparian ecosystem processes: Invasive tunicates, Japanese knotweed, reed canary grass, giant hogweed, yellow flag iris, purple loosestrife and European bittersweet  Artificial propagation  Fish hatcheries: Salmon production has potential negative ecological and genetic impacts on natural populations and	A: Protect intact ecosystem processes, structures and functions Growth and development: Implement local portions of Puget Sound Regional Council Vision 2040 Plan Protect high value habitat: Acquire high priority marine and freshwater habitat identified in salmon recovery and other local plans; develop local acquisition strategy Update and implement regulatory programs: Shoreline Master Program (Mason, Jefferson and Kitsap counties); Critical Area Ordinance (Mason County) Protect and conserve stream flows: Establish or update and implement instream flow rules for WRIA 14b, 15, 16, 17; complete and or implement Watershed Plans for WRIA 14b, 16, 17 Protect and support long-term stewardship of working farms, forests, and shellfish farms, notably on the Tahuya Peninsula and east Jefferson County  B: Restore ecosystem processes, structures and functions Implement priority ecosystem restoration projects: Implement priority ecosystem restoration projects: Implement priority ecosystem processes, structures and functions Implement priority ecosystem restoration projects: Implement priority ecosystem restoration projects: Implement Foreis recovery plans including: Hood Canal Summer Chum, Skokomish Chinook, mid-Hood Canal Chinook and Bull Trout; implement in coordination with the Shoreline Master Program restoration plans and the three-year work plans Complete Skokomish River Ecosystem Restoration and Flood Damage Reduction Study; complete Skokomish River and Quilcene delta restoration projects Implement Foreis Practices Habitat Conservation Plans; implement Road Maintenance and Abandonment Plans; decommission or maintain USFS roads; implement Conservation District work plans; implement County Marine Resource Plans Strategically remove derelicit fishing gear  C: Reduce sources of water pollution Prevent pollution: Establish and implement a Pollution Identification and Correction Program in Kitsap countly Develop and implement Watershed Management Plans and 303d category 4b plans Inplement shellifish protection district pla

## North Central Action Area

Ecosystem benefits provided by action area	Local threats to ecosystem benefits	Priority action area strategies
Inique habitat type and ecosystem processes  Freshwater: Lowland stream habitats in West Sound watersheds support chum, coho, cutthroat and steelhead  Marine nearshore: Supports chum, pink, coho, and Chinook salmon and steelhead from throughout Puget Sound  Tood and Timber (harvest)  Shellfish production and harvest Recreation and tourism  Boating, state parks, shoreline access  Community and economy  Water-oriented communities  Commerce, military, and marine transportation hub Homeland security: Keyport Naval Undersea Warfare Center, Puget Sound Naval Shipyard; Manchester Fuel Depot  Model program for water quality improvements via "pollution identification and correction"  Port Gamble S'Klallam Tribe  Suquamish Tribe	Habitat alteration  Marine nearshore: 49% of shoreline modified, especially in south part of action area and Bainbridge Island; 291 piers and docks, 108 boat ramps on Bainbridge Island; loss of marine riparian habitat  Freshwater: Loss of working farms and forests through conversion for urban and suburban uses; 12% impervious surface overall with considerable variation by watershed  Pollution  Toxics: Hundreds of acres of contaminated sediments, especially at Sinclair and Dyes inlets, Liberty Bay, and Eagle Harbor from a history of naval and industrial activities; groundwater contamination from Eagle Harbor superfund site  Bacterial contamination: threatened and closed shellfish growing areas and 7 local streams closed for human contact  Nutrient loading: low dissolved oxygen in bays, especially in areas of poor flushing  Surface water runoff impacts: CSO and SSO events  Freshwater resources  Limited water availability for people, farms and fish: streamflows dependent on precipitation and groundwater; 80% of drinking water comes from groundwater; streams in urbanized watersheds are subject to low summer flows and peak storm flows.  Invasive species  Potential negative ecological impacts on native populations: Knotweed and other non-native invasive species in some locations; invasive tunicates in Eagle Harbor  Artificial propagation  Fish hatcheries: Salmon production has potential negative ecological and genetic impacts on natural salmon and other hatchery populations; Salmon net pens: commercial production of Atlantic salmon in Rich Passage; Shellfish production: not identified as a local issue;  Harvest  Fishing and bycatch, logging, and hunting practices: Local pressures need to be identified  Localized climate change impact  Sea level rise: Loss of beach land by 2050, converted to tidal flats; loss of marsh and pocket estuaries  Other  Population increase by 2025: 29% in Kitsap County (more than 67,000 people) and 43% in Pierce County (nearly 300,000 people)	A: Protect intact ecosystem processes, structures and functions Growth and development: Implement local portions of Puget Sound Regional Council Vision 2040 Piccoordinate with local transportation planning Protect high value habitat: Acquire "1000 Acre Woods" critical habitat north of Gig Harbor; protect remaining intact nearshore habitat Update and implement regulatory programs: Shoreline Master Program (Gig Harbor, Bremerton, Kits County, Bainbridge, Poulsbo, Port Orchard; Pierce County); Critical Area Ordinance (Port Orchard) Protect and conserve water flows:  Manage lands and runoff to ensure plentiful and clean groundwater recharge Implement water conservation and reclaimed water development and use  B: Restore ecosystem processes, structures and functions Implement priority ecosystem restoration projects: Implement Salmon Recovery three-year workplans Complete Chico Creek, Carpenter Creek and other salmon restoration priority projects Implement Ecommendations of Gig Harbor Basin Plan, and Crescent Valley Biodiversity Stewardship Plan in a coordinated way Adopt and implement Bainbridge Island Open Space Plan Implement stewardship incentives to increase private landowner restoration projects: Remove hard shoreline armoring; restore native riparian vegetation; restore marsh habitat  C: Reduce sources of water pollution Prevent pollution: Creeduce sources of pollution that re-contaminate sediment cleanup sites; support Navy ENVVE project and other opportunities to cooperate to reduce pollution Implement KGI Watershed Action Plan Manage stormwater runoff: Upgrade wastewater treatment plants: Enforce already required modifications to sewer systems to an further pollution  Manage on-site sewage systems: Implement Pierce and Kitsap counties onsite management plans; continue to implement KItsap County's Pollution Identification and Correction program  D: Work effectively and efficiently together on priority actions Continue to improve WRIA 15 salmon recovery coordination for implementation Continue coordination am

## **South Sound Action Area**

Ecosystem benefits provided by action area	Local threats to ecosystem benefits	Priority Action Area strategies
<ul> <li>Unique habitat types and ecosystem processes</li> <li>Marine/estuary: Nisqually River is largest undeveloped estuary in Puget Sound and largest National Wildlife Refuge in Puget Sound; important salmon, wildlife and bird habitat</li> <li>Marine/estuary: Nursery area for multiple Chinook populations</li> <li>Marine/estuary: Forage fish spawning areas</li> <li>Shoreline: Large areas of intact shoreline</li> <li>Upland: Unique prairie habitat with endemic species</li> <li>Food and timber (harvest)</li> <li>Nationally renowned shellfish; one of the largest shellfish producing areas in state</li> <li>Recreational and tribal clamming, crabbing and fishing</li> <li>Freshwater resources</li> <li>Hydropower for city of Centralia and city of Tacoma</li> <li>Leadership in reclaiming municipal wastewater</li> <li>Recreation and tourism</li> <li>Recreation: clamming, crabbing, Mount Rainier National Park, kayaking, boating</li> <li>Community and economy</li> <li>Numerous commercial and residential centers</li> <li>Center of state government</li> <li>Ports of Olympia and Shelton</li> <li>Homeland security: Fort Lewis &amp; McCord Air Force Base</li> <li>Nisqually Tribe</li> <li>Puyallup Tribe</li> <li>Squaxin Tribe</li> </ul>	Habitat alteration  Marine lestuary: Loss of riparian and estuary habitat, some intertidal alterations  Marine nearshore: 40% of shoreline modified; BNSF rail along eastern shoreline  Freshwater: Blocked habitat including dams and culverts on Deschutes River; fill for 1-5 on Nisquelly River  Upland: Loss of prairie habitat through land conversion; loss of hydrologic function from existing and expanding impervious surface  Pollution  Toxics: Industrial pollution in bays and contaminated sediments including Oakland Bay, Chambers Bay, Budd Inlet; military sewage treatment plant at Tatsolo Point  Bacteria contamination: Bacteria and pathogens from human and animal waste  Nutrient loading: Low dissolved oxygen in Budd Inlet, Case Inlet, and Carr Inlet  Air quality: Poor air quality due to particulate pollution (wood smoke, diesel emissions, etc.)  Freshwater resources  Low flows in WRIAs 11, 12, 14; flow issues in WRIA 13  Invasive species  Potential negative ecological impacts on native populations  Artificial propagation  Fish hatcheries: Salmon production has potential negative ecological and genetic impacts on natural populations and other hatchery populations and may compromise ability to develop viable, locally adapted populations; Shelfish production: Potential ecosystem impacts related to some aquaculture practices  Harvest  Fishing and bycatch, logging, and hunting practices: Local pressures need to be identified  Localized climate change impact  Sea level rise: Significant loss of estuarine beaches; inundation of tidal flats; flooding at downtown Olympia  Flooding of urban and rural areas  Other  Conflicting use values of marine shorelines  Harmful algal blooms in fresh and marine waters  Increase in population by 2025: 44%; more than 520,000 people, in Thurston, Pierce, Mason, Kitsap counties	A: Protect intact ecosystem processes, structures and functions  Protect high value habitat:  Protect undeveloped shoreline and support efforts to prevent development in floodplains Acquire high priority marine and fresh water habitat, including but not limited to: Gull Harbor in Budd Inlett. Lower Eld Inlet Shoreline Conservation; Twin River Ranch at Oakland Bay; Harstine Island Shoreline; Filucy Bay Farm and Shoreline, Devils Head; Lower Ohop Protection Project  Update and implement regulatory programs: Complete and implement Shoreline Master Program updates; complete and implement Critical Area Ordinances  Protect and conserve water flows: Continue and expand LOTT Alliance water reuse facilities and nutrient removal  B: Restore ecosystem processes, structures and functions  Implement priority ecosystem restoration projects:  Complete restoration of Nisqually estuary  Implement Salmon Recovery three-year workplans (WRIAs 10/12, 11, 13/14, 15)  Restore shorelines using WRIAs 11, 12, 13, 14, 15 nearshore assessments  Implement existing basin protection and restoration plans in Key Peninsula, Clover/Chambers, and Nisqually basins; develop plans for other South Sound basins  Develop and implement a multi-species recovery and management plan for salmonids and forage fish not addressed in Chinook Recovery Plans  Support habitat and shoreline restoration efforts in Budd Inlet and Hammersley-Oakland Bay  Develop and implement conservation and recovery plans for prairie-dependent species  Restore estuaries and pocket estuaries throughout South Puget Sound  Revitalize waterfront communities: Support and encourage Port of Shelton and Port of Olympia strategic redevelopment plans, including stormwater retrofits; complete Deschutes Estuary Restoration  Prevent pollution: Implement existing Watershed Action Plans, Shellflish Protection Districts, and other water pollution: Implement existing Watershed Action Plans, Shellflish Protection Districts, and other water pollution cleanupy plans in a coordinated way; implement th

#### **South Central Action Area**

Ecosystem benefits provided by action area	Local threats to ecosystem benefits	Priority action area strategies
<ul> <li>Inique species</li> <li>More than 17 unique populations of salmon, trout and steelhead</li> <li>Endemic species of beetles</li> <li>Remnant Margaritifera mussel populations</li> <li>Inique habitat types and ecosystem processes</li> <li>Freshwater: Core area for Bull Trout recovery (Puyallup/White)</li> <li>Upland: intact upland forest in and around Mount Rainer National Park</li> <li>reshwater resources</li> <li>Water supply for city of Seattle, city of Tacoma, and surrounding metropolitan areas; many water supply watersheds are protected</li> <li>ood and timber (harvest)</li> <li>Recreational harvest: Lake Washington sockeye and Issaquah Creek Chinook</li> <li>Significant agriculture areas</li> <li>Commercial, recreational, and tribal fishing</li> <li>Hatcheries provide harvest opportunities and population stability while wild salmon stocks rebuild: White River spring Chinook, Puyallup steelhead</li> <li>ecreation and tourism</li> <li>Mount Rainer National Park, Mount Baker-Snoqualmie National Forest, Lake Washington, Lake Tapps, Lake Sammamish, Mountain to Sound Greenway, Alpine-Lakes Wilderness, boating, sport fishing, diving</li> <li>fommunity and economy</li> <li>Population center for Puget Sound with more than three million residents</li> <li>Commercial &amp; industrial hub, generating 63% of the gross state product</li> <li>Significant rural areas</li> <li>Home of the North Pacific fishing fleet</li> <li>International port facilities and cruise ship terminal</li> <li>Largest wastewater treatment system in the state with innovative Brightwater Treatment Plant</li> <li>Marine trades</li> <li>Leadership on low impact development and green infrastructure approaches, including Built Green and Green Tools programs</li> <li>Muckelshoot Tribe</li> <li>Puyallup Tribe</li> </ul>	Habitat alteration  MarineJestuary: Major loss of estuary habitat in Duwamish and Puyallup River estuaries and creation of an artificial estuary created by the Ballard Locks.  Marine nearshore: 75% of shoreline modified, including overwater structures, shoreline armoring, dredging, filling, and marine shoreline vegetation removal  Freshwater: Over 100 miles of blocked nabitat with dams and diversions (Green, White, Puyallup); significant alteration of rivers, ficodeplains and shorelines; river straightening and channelization (Duwamish, Puyallup), Cedar, Sammanish); floodplain development; extensive alteration of surface hydrology, especially Lake Washington, Ballard Locks, White, Cedar, Puyallup, Duwamish and Black Rivers; significant diversion of water to drinking water supply and wastewater systems to Puget Sound, altering migration routes for salmon, modifying hydrology  Upland: Loss of working farms and forests through conversion; 34% impervious surface in urban growth area; increasing urban and rural development  Pollution  Toxics: Duwamish and Commencement Bay Superfund sites; recontamination of previously cleaned up sites; risk of pollution from maritime activities  Bacterial pollution: Failing septic systems in nearshore areas and throughout watersheds; agricultural runoff  Air pollution: Significant source from automobile emissions  Nutrient loading: Especially in areas with limited flushing, (Shilshole Bay, Quartermaster Harbor, and Dumas)  Surface water runoff impacts: Major source of urban stormwater runoff and pollutants into Puget Sound  Freshwater resources  Limited water availability for people, farms, and fish: Low summer flows and high peak stream flows in WRIAs 8,9,10/12; low mainstem winter flows  Increased future water demand for higher population:  Localized areas of saltwater intrusion into groundwater  Invasive species  Potential negative ecological impacts on native populations: Japanese knotwed, reed canny grass, and butterfly bush infestations along riparian corridors; non-native fi	A: Protect intact ecosystem processes, structures, and functions  Growth and development: Implement Vision 2040 Plan  Protect high value habitat:  Acquire high priority habitats (e.g., Lower Puyallup transition zone habitat, White River PSE properties, South Prairie Creek, Middle Puyallup forest lands, Middle Green River, Vashon Isl Upper Cedar River)  Implement White River Biodiversity Stewardship Plan  Implement Habitat Conservation Plans (forest & fish plans, Cedar, Green, Tacoma)  Implement Pierce and King counties transfer of development rights programs, cluster development, and increase density in urban areas; utilize conservation easements and Public Benefit Rating System  Update and implement regulatory programs: Shoreline Master Program updates (King and Picounties, all relevant cities); critical Area Ordinance updates (all relevant cities); restrict additis shoreline armoring  Protect and conserve water flows: Establish and implement instream flow agreements in Green, Whi Lake Washington, Puyallup; promote water conservation and reclaimed water use  Protect and support long-term stewardship of working farms, forests and shellfish farms  B: Restore ecosystem processes, structures, and functions  Implement priority ecosystem restoration projects:  Implement priority ecosystem restoration projects:  Implement agninan Recovery three-year work plans for WRIAs 8, 9, 10/12  Implement agninan Recovery three-year work plans for WRIAs 8, 9, 10/12  Implement Bamon Recovery three-year work plans for WRIAs 8, 9, 10/12  Implement Bamon Recovery three-year work plans for WRIAs 8, 9, 10/12  Implement Samon Recovery three-year work plans for WRIAs 8, 9, 10/12  Implement Samon Recovery three-year work plans for WRIAs 8, 9, 10/12  Implement Bamon Recovery three-year work plans for WRIAs 8, 9, 10/12  Implement Bamon Recovery three-year work plans for WRIAs 8, 9, 10/12  Implement Bamon Recovery three-year work plans for WRIAs 8, 9, 10/12  Implement Bamon Recovery three-year work plans for WRIAs 8, 9, 10/12  Implement Bamo

pharmaceutical take-back programs

#### **Whidbey Action Area**

#### Ecosystem benefits provided by action area Local threats to ecosystem benefits Priority action area strategies **Habitat alteration** A: Protect intact ecosystem processes, structures and functions Unique species Numerous salmonids; core bull trout populations Marine/estuary: Loss of estuary tidal marsh and habitat connectivity, with more than 80% of the Snohomish. Protect high value habitat: Examples include Northern Smith Island kelp, Padilla, Skagit and Fidalgo Gray whales in Saratoga Passage approximately 75% of the Skagit, and 85% of the Stillaguamish estuaries diked, cutting off tidal marshes and blind bays eelgrass beds, intact mainstem rivers, and unique spawning areas and bird habitat; evaluate need tidal channels; only 18% of historic wetlands remain; potential future impacts from tidal power generation to protect ecosystem processes and quality of life needs when considering tidal energy projects Unique habitat types and ecosystem processes Shorelines: Development along lake shorelines, reducing habitat availability and heterogeneity, increasing Update and implement regulatory programs: Complete and implement Shoreline Master Program Marine/estuary: Important hake spawning area nitrification, increases in invasive species and toxic algal blooms updates on schedule; adopt clearing and grading ordinances throughout Whidbey Basin Marine/estuary: Three large estuaries provide Marine nearshore: 38% of marine shoreline armored: over 5.000 overwater structures; 5.6 miles of railroad grade; Protect and conserve water flows: Implement flow rules and programs in all basins; upgrade flow rules migratory cross-roads for many salmon populations. disconnected feeder bluffs and pocket estuaries, development in sensitive areas in Snohomish, Skagit, and Stillaguamish basins significant bird habitat, some of the largest eelgrass Freshwater: Loss of large river habitat complexity and floodplain connectivity from diking, riparian clearing, and Protect and support long-term working farms, forests, and shellfish farms: Support TDR/PDR programs; beds in Puget Sound, significant kelp beds (west floodplain development, reducing wood debris jams, side-channels, forested islands and pools provide technical assistance to landowners coast of Island County) Uplands: Loss of working farms and forests through conversion resulting in altered basin hydrology and degraded Invasive species: Continue local efforts to identify and eradicate invasive species impairing habitat Freshwater: Major Chinook producing rivers (Skagit, habitat; 16% increase in impervious surface in Snohomish watershed from 1991-2001; potential future Stillaguamish, Snohomish systems); major producer development pressure in nearshore, river valley and upland areas B: Restore ecosystem processes, structures and functions Implement priority restoration projects: Implement Salmon Recovery three-year work plan (WRIAs 3, 4, of coho in Puget Sound and on West Coast Upland: Intact upland forests in and around North **Pollution** 5, 6, 7), and restoration components of shoreline management plans Cascades National Park, Alpine Lakes, Wild Sky, Complete large scale estuary restoration projects in the Skaqit, Snohomish, and Stillaguamish rivers and **Toxics**: Groundwater contamination leaching from past industrial development Glacier Peak Wilderness **Bacterial pollution:** 48% of impaired waters listings due to bacterial pollution; shellfish harvest closures in Holmes meet restoration targets set in the salmon recovery plans Harbor, Penn Cove, Samish Bay, Similk Bay, and Port Susan Bay Implement large-scale floodplain projects to remove bank armoring, re-connect side channels and Nutrient loading: Contributes to eutrophication and naturally occurring low dissolved oxygen concentrations in provide mainstem rivers with ability to migrate and create diverse instream habitat Freshwater resources Significant freshwater input from large rivers Penn Cove, Saratoga Passage, Possession Sound: dissolved oxygen and temperate concerns found in streams Prioritize and strategically remove derelict gear removal Hydropower for Western Washington power grid Surface water runoff impacts: Pollutant loading from urban stormwater and agricultural runoff; emerging pre- Sultan River provides water supply for Everett spawn fish mortality concern C: Reduce sources of water pollution Prevent pollution: Food and timber (harvest) o Implement Watershed Management Plans addressing temperature, dissolved oxygen, mercury, Freshwater resources Strong agriculture base: dairy, flowers, vegetables • Limited water availability for people, farms, and fish: Low summer flows in WRIAs 5 & 7; and bacteria impairments Altered magnitude, frequency and duration of peak flow events in WRIAs 3, 4, 5 & 7 o Evaluate low dissolved oxygen levels in Penn Cove, Holmes Harbor, Saratoga Passage, and berries, nursery Shellfish production and Dungeness crab fishery Alteration of surface hydrology: Major alterations for flows in Skagit and Sultan rivers below dams Possession Sound, and develop and implement strategy to address low dissolved oxygen levels • Increased freshwater demand from more people, resulting in decreased aquifer levels, saltwater intrusion, and Commercial, tribal, and recreational fishing if necessary (using lessons learned in Hood Canal) Some hatcheries provide harvest opportunities and decreased groundwater discharge o Provide support for technical assistance and cost-share programs for small farms and population stability while wild salmon stocks rebuild commercial agriculture to improve and integrate agricultural nutrient management; integrate small Timber, pulp production farms into current programs; and keep livestock out of streams • Potential negative ecological impacts on native populations: Japanese knotweed, Spartina Implement shellfish protection plans Manage stormwater runoff: Implement NPDES permits; use and increase site-appropriate LID Recreation and tourism North Cascades National Park and Wilderness Areas. **Artificial propagation** techniques to manage for future planned growth; begin stormwater retrofits in dense urban areas Boulder River and Henry M. Jackson Wildernesses Salmon production has potential negative ecological and genetic impacts on natural populations and other Manage on-site sewage systems: Support local efforts to identify and control sources of pollution hatchery populations; Shellfish production: not identified as a local issue sport fishing, boating, whale watching, skiing Tourist attractions at small waterfront communities D: Work effectively and efficiently together on priority actions Harvest Coordinated long-term strategy: Community and economy Fishing and bycatch, logging, and hunting practices: Fishing and poaching; other local pressures need to be Support integration of species recovery, water quality, aquatic reserve and natural resource Significant employment and population centers. identified management plans, shoreline master programs, and Marine Resource Committee strategies: including rural water-connected communities start with salmon recovery, MRC, and water management plans (Camano and Whidbey islands) Continue to work cooperatively with farming community to develop a coordinated restoration Localized climate change impacts Deepwater ports that support shipping and industry, Sea level rise: significant change and loss of estuarine habitat in Snohomish, Stillaguamish, and Skagit estuaries; strategy that balances the needs of agriculture and fish; support engagement of salmon recovery including Port of Everett significant loss of Whidbey Island beaches; risk of salt water intrusion; potential loss of floodplain capacity from watershed groups with the Snohomish and Skagit County Agricultural Advisory Boards and other Homeland security: Whidbey Island Naval Air Station; farming groups; support collaborative efforts to negotiate the Skagit Delta Tidegates and Fish Naval Station Everett Changes in hydrology due to reduced snow pack and forest cover Swinomish Tribe Sustain recent collaborative efforts to identify protection and restoration opportunities in the **Tulalip Tribes** Skagit watershed; maintain ongoing efforts in the Snohomish and Stillaguamish basins Other Increase in population by 2025: 49% in Skagit, Island, Snohomish counties (over 380,000 people) Investigate a permit coordination pilot project in the Snohomish Basin Stillaguamish Tribe Toxic algal blooms in lake systems Implement Skagit Alternatives Futures Project results; expand project as warranted; integrate and Sauk-Suiattle Tribe

Upper Skagit Tribe

Snoqualmie TribeSamish Tribe

#### E: Implement the Action Agenda

Outreach and education: Implement STORM group recommendations

coordinate project with other Skagit community efforts

# **Whatcom County**

Ecosystem benefits provided by action area	Local threats to ecosystem benefits	Priority action area strategies
Unique species Two unique spring run Chinook populations in Nooksack River Historically significant Cherry Point herring spawning area ESA listed bull trout distinct population segments Unique habitat type and ecosystem processes Marine/estuary: Forage fish habitat Upland: Migratory bird habitat Upland: Intact forests in and around Cascades National Park Cherry Point Aquatic Reserve  Freshwater resources Lake Whatcom watershed, including water diverted from the Middle Fork Nooksack River, provides water for half of Whatcom County Shared rivers and streams with Canada  Food and timber (harvest) Large agriculture: Significant dairy industry (ranks in top 5 dairy regions nationally), 75% of U.S. raspberry production, blueberries. Shellfish aquaculture and Dungeness crab fishery (tribal, commercial and recreational) Commercial, tribal, and recreational Commercial timber production Hatcheries to provide harvest opportunities and population stability while wild salmon stocks rebuild (South Fork Nooksack spring Chinook, North Fork Nooksack spring Chinook)  Recreation and tourism Mount Baker, North Cascades, rafting, hiking, kayaking, skiing, birding, Birch Bay, Nooksack River, Lake Whatcom  Community and economy Rural communities Proximity to recreation draws outdoor enthusiasts to reside in area Lummi Nation Nooksack Tribe	Marine: 3.000+ derelict crab pots and multiple fishing nets in Cherry Point reach and other areas     Marine/estuary: Loss of native eelgrass meadows due to shoreline modification and dredging in inner Bellingham Bay     Marine nearshore: 36% of shoreline modified; degradation of marine riparian vegetation and function     Freshwater: Loss of mainstem and floodplain river habitat; culverts and dams disrupt hydrology and/or block habitat; loss of fiprain function and straightening of stream channels     Upland: Loss of forest cover and extensive forest road drainage resulting in landslides and adding to high water temperatures that cause pre-spawn mortality  Pollution     Toxics: Industrial pollution in Bellingham Bay include metals, PAHs, nutrients; large refinery and aluminum smelter at Cherry Point     Bacterial pollution: nutrients and pathogens from human and animal waste lead to shellfish closures in Drayton Harbor, Portage Bay, Chuckanut (Mud) Bay, Birch Bay     Low dissolved oxygen, mercury and phosphorous in Lake Whatcom     Surface water runoff impacts: Bellingham Bay, Birch Bay, Drayton Harbor  Freshwater resources     Low instream flows and many established instream flows not being met  Invasive species     Potential negative ecological impacts on native populations: tunicates in Blaine Marina, Drayton Harbor, Chuckanut Bay, Birch Bay, rock snot in Chuckanut area; knotweed in Nooksack estuary; Spartina in Birch Bay  Artificial propagation     Salmon production has potential negative ecological and genetic impacts on natural populations and other hatchery populations; Fall Chinook hatchery production has potential negative impacts on nature spring-run Chinook  Harvest     Fishing and bycatch: Nooksack Chinook salmon runs heavily impacted by Canadian harvest and fish poaching; Logging and hunting practices: Local pressures need to be identified  Localized climate change impact     Sea level rise: loss of swamp, marsh and estuarine beach in Nooksack Delta; possible conversion of habitat types     P	A: Protect intact ecosystem processes, structures, and functions Protect high value habitat: Develop strategy to protect large intact marine and nearshore habitat; implement protection strategies in salmon recovery plans and Shoreline Master Program; complete management plan for Cherry Point Aquatic Reserve Update and implement regulatory programs: Implement Critical Area Ordinance updates and the county's and cities' Shoreline Master Programs; implement have land use measures and mitigation alternatives through implementation of the Birch Bay Watershed characterization Pilot Study Protect and conserve water flows: Implement Instream Flow Action Plan for WRIA 1; address illegal water withdrawals Protect and support long-term stewardship of working farms, forests and shellfish farms: Limit forest and farm conversions; ensure that forest practices are enforced  B: Restore ecosystem processes, structures, and functions Implement priority ecosystem restoration projects in existing plans:  Implement Salmon Recovery three-year work plan for WRIA 1 Implement the Shoreline Master Program restoration plan coordinated with salmon recovery efforts and nearshore and marine resource programs and projects Quantify impacts from derelict fishing and strategically remove starting with Cherry Point Enhance habitat on forested and resource lands  C: Reduce sources of water pollution Prevent pollution: Implement Watershed Management Plans in Drayton Harbor, Whatcom Creek, Lower Nooksack Basin, Lake Whatcom; clean up Drayton Harbor, Birch Bay, and Portage Bay by implementing Shellfish Protection Plans and completing and implementing other water quality plans in a coordinated way; continue efforts to manage refinery at Chery Point to minimize pollution Manage stormwater runoff: Implement NPDES permits; implement Lake Whatcom, Birch Bay and Bellingham Bay Comprehensive Stormwater for discharges Manage on-site sewage systems: Implement O&M plans with initial focus on marine recovery areas, shellfish protection districts, and Lake What